



US009636588B2

(12) **United States Patent**
Horovitz et al.

(10) **Patent No.:** **US 9,636,588 B2**
(45) **Date of Patent:** ***May 2, 2017**

(54) **SYSTEM AND METHOD FOR OBJECT
EXTRACTION FOR EMBEDDING A
REPRESENTATION OF A REAL WORLD
OBJECT INTO A COMPUTER GRAPHIC**

(58) **Field of Classification Search**
CPC . G06F 17/50; H04N 9/09; H04N 7/18; G06K
9/46; G06K 9/00; A63F 13/00;
(Continued)

(71) Applicant: **EYECUE VISION TECHNOLOGIES
LTD.**, Yokneam Ilite (IL)

(56) **References Cited**

U.S. PATENT DOCUMENTS

(72) Inventors: **Ronen Horovitz**, Haifa (IL); **Ran
Kaftory**, Kiryat Tivon (IL)

3,904,207 A 9/1975 Gold
4,275,449 A * 6/1981 Aish G06F 3/033
345/420

(73) Assignee: **EYECUE VISION TECHNOLOGIES
LTD.**, Yokneam (IL)

(Continued)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 118 days.

FOREIGN PATENT DOCUMENTS

EP 1047017 10/2000
JP 09-102042 4/1997

(Continued)

This patent is subject to a terminal dis-
claimer.

OTHER PUBLICATIONS

(21) Appl. No.: **13/960,866**

Anderson et al., Tangible interaction + graphical interpretation: a
new approach to 3D modeling, SIGGRAPH '00 Proceedings of the
27th annual conference on Computer graphics and interactive
techniques, pp. 393-402.*

(22) Filed: **Aug. 7, 2013**

(Continued)

(65) **Prior Publication Data**

US 2013/0321447 A1 Dec. 5, 2013

Related U.S. Application Data

(63) Continuation of application No. 13/201,512, filed as
application No. PCT/US2010/044343 on Aug. 4,
2010, now Pat. No. 9,498,721.

(Continued)

(51) **Int. Cl.**
G06T 11/60 (2006.01)
A63F 13/655 (2014.01)

(Continued)

(52) **U.S. Cl.**
CPC **A63F 13/655** (2014.09); **A63F 13/00**
(2013.01); **A63F 13/06** (2013.01); **A63F**
13/213 (2014.09);

(Continued)

(57) **ABSTRACT**

Systems and methods for extracting an image of a physical
object constructed of for example bricks are presented. The
method and system may detect boundaries and edges of a
background using an edge detection operator, perform a
perspective transformation calculation to compute a cor-
rected virtual grid that is substantially aligned with the
physical object's image, locate a color calibration palette in
the digital image and extract color value information for
pixels of the color calibration palette, and discern bricks as
part of the physical object's image, the discernment being
based in part on a determination of the brick's color com-
pared to the color palette and the background color, the

(Continued)

